

GLOBAL ECONOMIC OUTLOOK – MAY

Monetary and Statistics Department
External Economic Relations Division

2012

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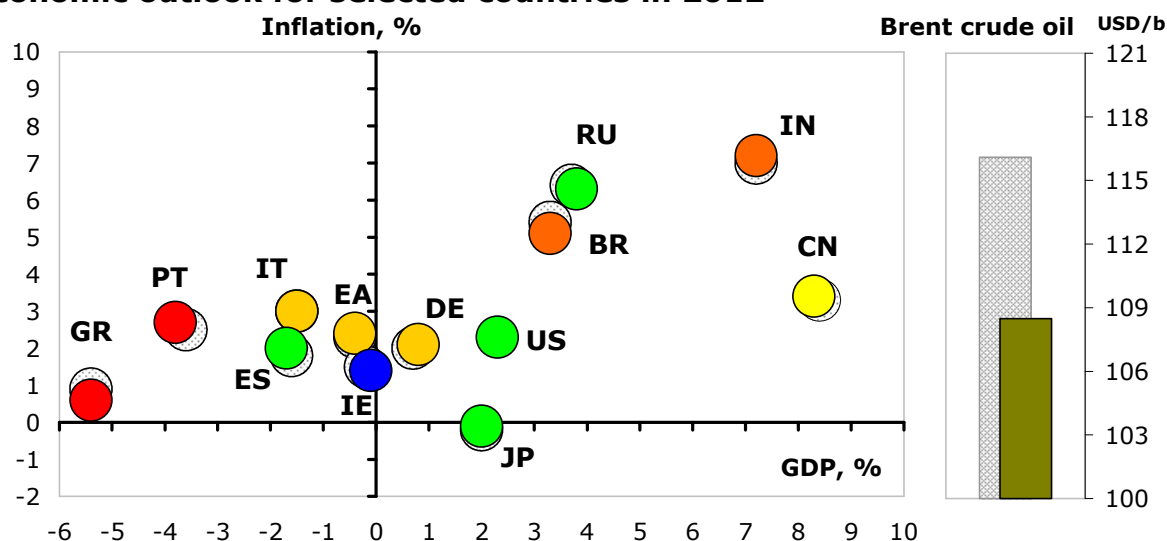
The May issue of *Global Economic Outlook* presents its regular overview of recent and expected developments in selected territories in terms of standard indicators such as GDP, inflation, leading indicators, interest rates, exchange rates and commodity prices. In this issue, we also focus our attention on presenting the world's most frequently used commodity indices. These indices differ in the number and structure of the commodities they are composed of, their calculation method and their purpose.

The revised economic outlooks confirm that 2012 will be a year of weaker economic performance in most advanced countries. For the euro area economy, moreover, it will very likely be a year of economic contraction, mainly because of persisting weak domestic and global demand, tight fiscal policy and the problems of countries on the southern periphery. The euro area economy continues to be driven by Germany, whose economic condition, like that of the USA, should gradually improve. By contrast, the macroeconomic situation of Greece and Portugal is unenviable, as these two countries are not showing any visible signs of change in their business cycles given the economic downturn expected this year. This fact is evidenced by the evolution of the OECD composite leading indicator (see the figure below).

Emerging economies, especially the BRIC countries (Brazil, Russia, India and China), are still showing robust economic growth at an acceptable inflation rate. China is still number one in this group of countries, with the highest GDP growth outlooks and the lowest inflation this year and the next.

In the remainder of 2012, the global economy could partly benefit from the sizeable decline in oil prices in May and the still falling outlook for oil prices. Growth in demand for oil is losing momentum, while the oil supply (especially from OPEC countries) is rising. The dollar price of oil (and of other commodities) is also being pushed down by the strong dollar. A resurgence of geopolitical risks, which have recently been receding, may pose a risk. Industrial commodity prices have decreased as well and are expected to stay flat around their present levels. As for food commodities, prices of maize and soy (alternative energy crops) should continue falling, while prices of wheat and rice should rise. However, the strong dollar may represent an increased inflation risk for countries whose currencies are not tied to the US dollar. Nonetheless, in the euro area ECB interest rates are expected to be stable at the one-year horizon, and in the USA the expectations of unchanged rates extend beyond 2014.

Economic outlook for selected countries in 2012



OECD-CLI

102.1 101.4 100.8 ≥100 99.2 98.4 97.6

outlook XII-2012

Note: EA – euro area, DE – Germany, US – United States, JP – Japan, CN – China, IN – India, BR – Brazil, RU – Russia, GR – Greece, IE – Ireland, IT – Italy, PT – Portugal, ES – Spain. The points are coloured according to OECD-CLI (Composite Leading Indicator, amplitude adjusted). The grey colour is the CF forecast (GDP, inflation) or Bloomberg survey (oil price) from the previous month. [Cut-off date for data: 18 May 2012]

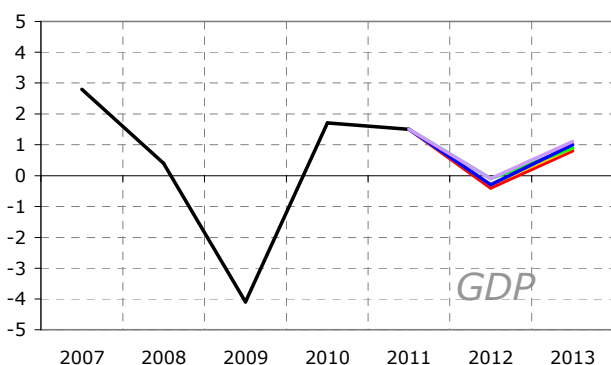
Source: CNB calculation using Bloomberg, Consensus Economics and OECD databases.

II.1 GDP

Political tensions in Greece in the first half of May and worse macroeconomic data for the euro area brought nervousness and uncertainty about future developments in the region back to the markets. The new outlooks only partially reflect the recent events. New reports from international institutions point to a gradual upturn in global economic activity amid persisting high risks of economic downturn. The GDP growth outlooks (CF, EC, Fed, IMF and OECD) for the economies under review lie mostly within a narrow band. The euro area economy will contract by 0.1–0.4% **in 2012**. Germany will record slight growth of 0.6–1.2%, supported by recent favourable macroeconomic data. GDP growth in the USA and in China will be 2.0–2.7% and 8.2–9.3% respectively. **Next year** should see better economic results for all the economies under review. GDP growth in the euro area will turn positive again (0.8–1.0%). German GDP will grow by 1.5–1.7%. Economic growth in the USA will improve only slightly, to 2.1–2.9%. Growth in China will be between 8.2% and 8.8%.

EURO AREA

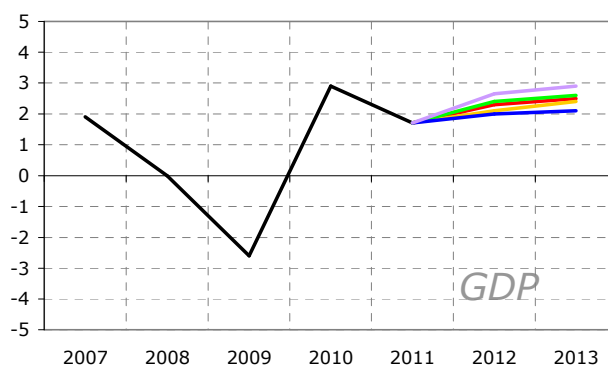
— HIST — CF, 5/12 — IMF, 4/12
 — OECD, 5/12 — EC, 5/12 — ECB, 3/12



	HIST	CF	IMF	OECD	EC	ECB
2011	1.5					
2012		-0.4	-0.3	-0.1	-0.3	-0.1
2013		0.8	0.9	0.9	1.0	1.1

USA

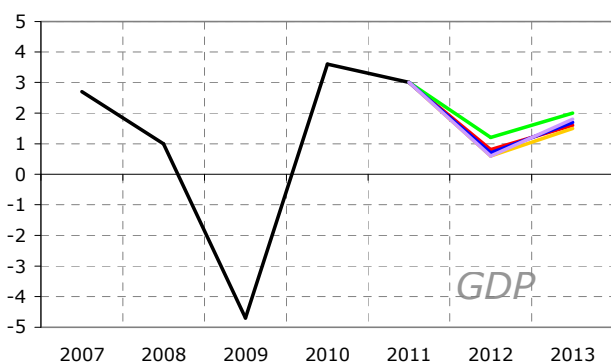
— HIST — CF, 5/12 — IMF, 4/12
 — OECD, 5/12 — EC, 5/12 — Fed, 4/12



	HIST	CF	IMF	OECD	EC	Fed
2011	1.7					
2012		2.3	2.1	2.4	2.0	2.7
2013		2.5	2.4	2.6	2.1	2.9

GERMANY

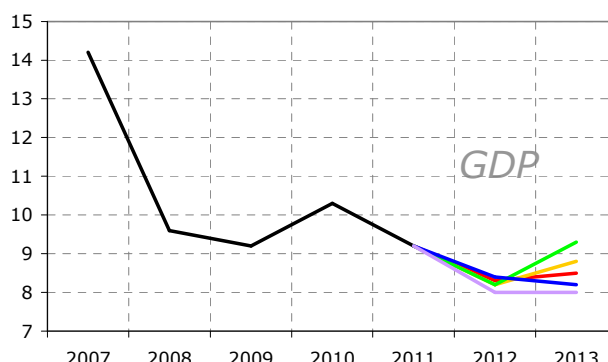
— HIST — CF, 5/12 — IMF, 4/12
 — OECD, 5/12 — EC, 5/12 — DBB, 12/11



	HIST	CF	IMF	OECD	EC	DBB
2011	3.0					
2012		0.8	0.6	1.2	0.7	0.6
2013		1.6	1.5	2.0	1.7	1.8

CHINA

— HIST — CF, 5/12 — IMF, 4/12
 — OECD, 5/12 — EC, 5/12 — BOFIT, 3/12



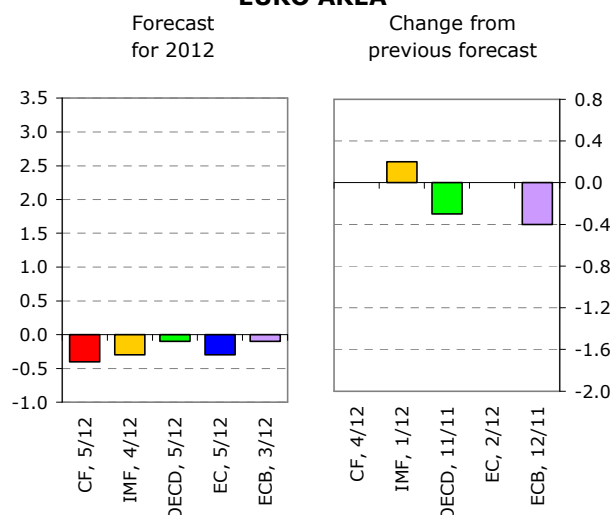
	HIST	CF	IMF	OECD	EC	BOFIT
2011	9.2					
2012		8.3	8.2	8.2	8.4	8.0
2013		8.5	8.8	9.3	8.2	8.0

Note: Legend shows latest forecast data in format "Source, month/year of forecast publication". HIST: historical value. ECB and Fed: midpoint of range. [Cut-off date for data: 22 May 2012]
 Source: CNB calculation using Eurostat, CF, IMF, OECD, EC, ECB, Fed, DBB and BOFIT databases.

II.2 Current GDP forecast and change from the previous forecast

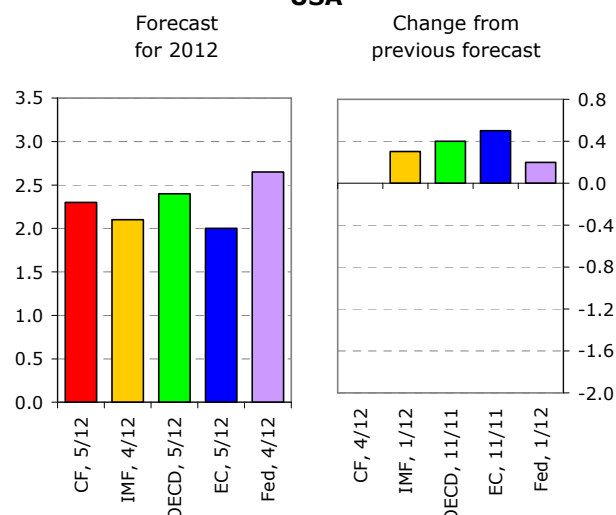
The outlook for euro area GDP growth in 2012 is 0.2 pp higher (IMF) or the same as in the previous forecast (CF and EC). At the same time, these institutions improved their outlook for Germany (CF and EC by 0.1 pp, IMF by 0.3 pp, OECD by 0.6 pp). Economic growth in the USA is expected to be 0.2–0.5 pp stronger than the previous forecast (EC, Fed, IMF, OECD) or to remain unchanged (CF). The forecast for China shifted in the opposite direction, with CF, EC and OECD expecting growth to be 0.1–0.3 pp lower. The IMF left its outlook unchanged.

EURO AREA



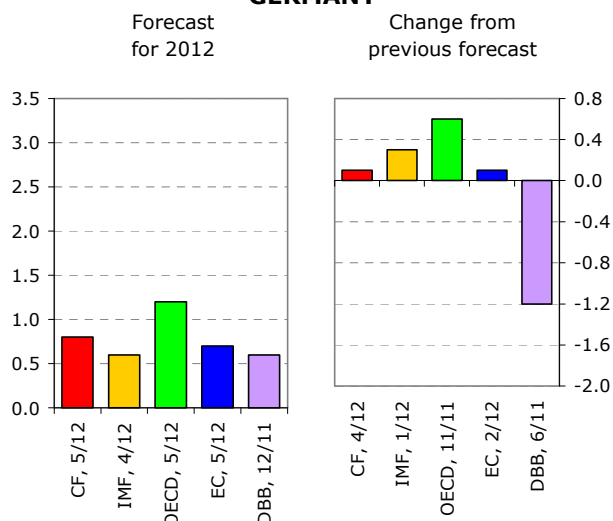
	2011	CF	IMF	OECD	EC	ECB
Forecast	1.5	-0.4	-0.3	-0.1	-0.3	-0.1
Change		0.0	0.2	-0.3	0.0	-0.4

USA



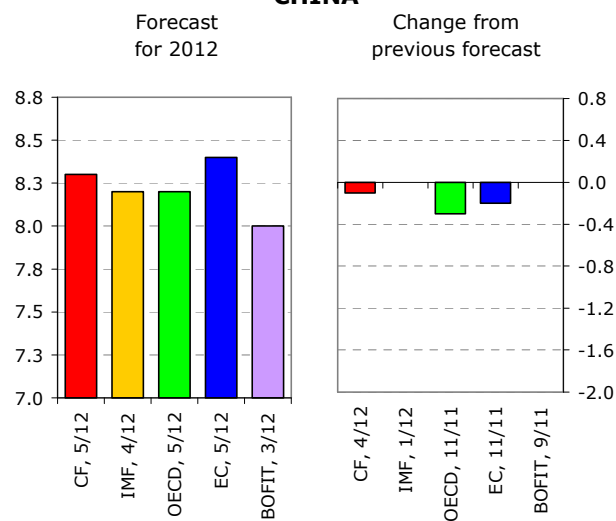
	2011	CF	IMF	OECD	EC	Fed
Forecast	1.7	2.3	2.1	2.4	2.0	2.7
Change		0.0	0.3	0.4	0.5	0.2

GERMANY



	2011	CF	IMF	OECD	EC	DBB
Forecast	3.0	0.8	0.6	1.2	0.7	0.6
Change		0.1	0.3	0.6	0.1	-1.2

CHINA



	2011	CF	IMF	OECD	EC	BOFIT
Forecast	9.2	8.3	8.2	8.2	8.4	8.0
Change		-0.1	0.0	-0.3	-0.2	0.0

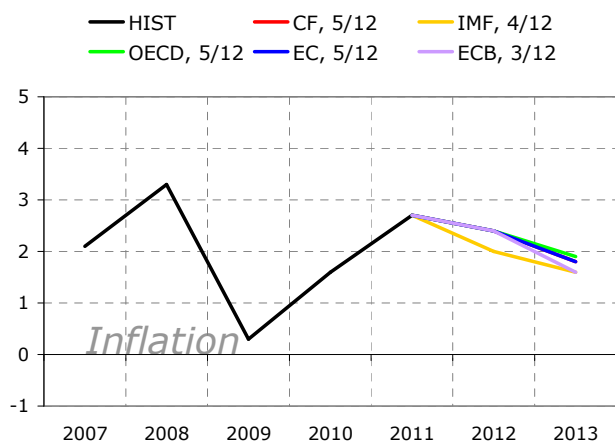
Note: Horizontal axis of left-hand (right-hand) chart shows latest (previous) forecast data in format "Source, month/year of forecast publication". HIST: historical value. ECB and Fed: midpoint of range. [Cut-off date for data: 22 May 2012]

Source: CNB calculation using Eurostat, CF, IMF, OECD, EC, ECB, Fed, DBB and BOFIT databases.

II.3 Inflation

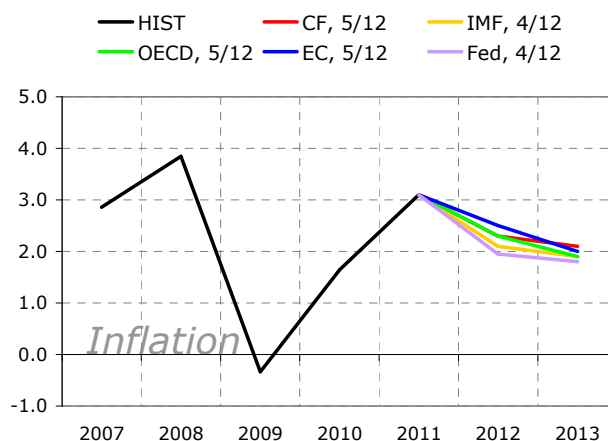
In 2012, prices in all the advanced economies under review will grow at the same rate according to current estimates (CF, EC, Fed, IMF and OECD): inflation of 2.0–2.4% is expected in the euro area (with Germany contributing 1.9–2.3%), while prices in the USA will go up by 2.0–2.5%. Inflation in China is still the highest of all the economies monitored in GEO and is expected to reach 3.3–3.4% according to the new CF, IMF and OECD forecasts. **In 2013**, inflation will slow to 1.6–2.0% in the euro area and Germany and to 1.8–2.1% in the USA. The new forecasts differ on inflation in China. Whereas the May CF expects inflation to rise further to 3.6% next year, the April World Economic Outlook (IMF) and May OECD Economic Outlook predict a slowdown to 2.8–3.0%.

EURO AREA



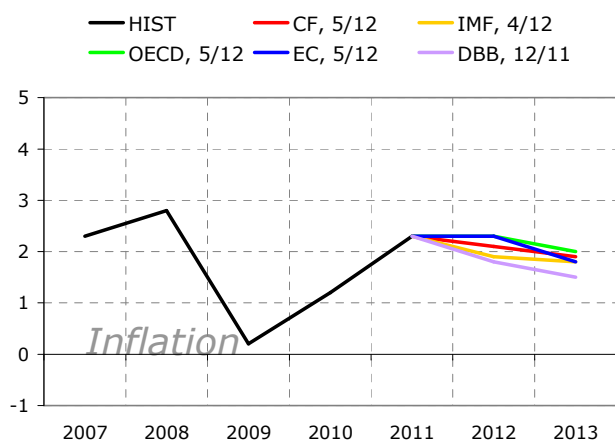
	HIST	CF	IMF	OECD	EC	ECB
2011	2.7					
2012		2.4	2.0	2.4	2.4	2.4
2013		1.8	1.6	1.9	1.8	1.6

USA



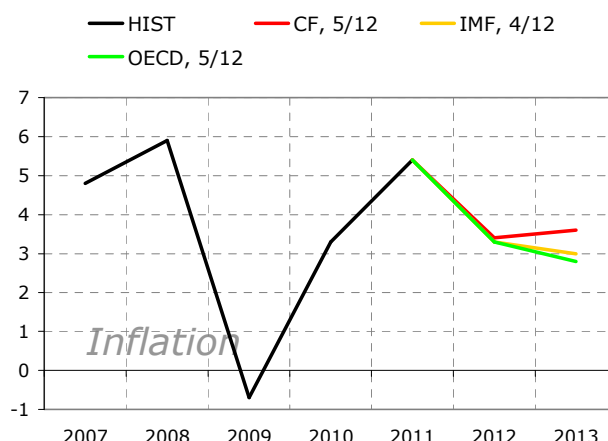
	HIST	CF	IMF	OECD	EC	Fed
2011	3.1					
2012		2.3	2.1	2.3	2.5	2.0
2013		2.1	1.9	1.9	2.0	1.8

GERMANY



	HIST	CF	IMF	OECD	EC	DBB
2011	2.3					
2012		2.1	1.9	2.3	2.3	1.8
2013		1.9	1.8	2.0	1.8	1.5

CHINA



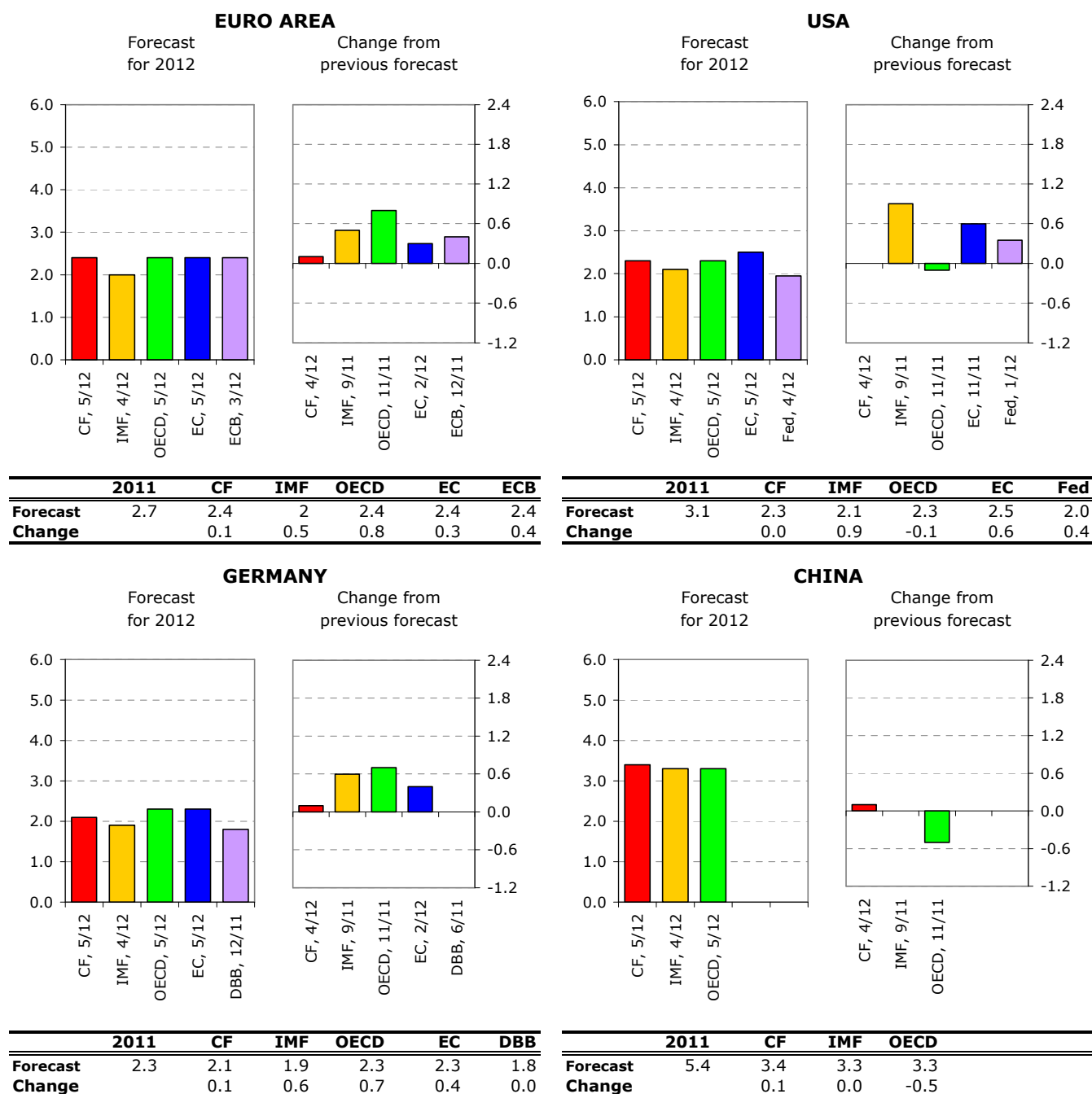
	HIST	CF	IMF	OECD
2011	5.4			
2012		3.4	3.3	3.3
2013		3.6	3.0	2.8

Note: Legend shows latest forecast data in format "Source, month/year of forecast publication". HIST: historical value. ECB and Fed: midpoint of range. [Cut-off date for data: 22 May 2012]

Source: CNB calculation using Eurostat, CF, IMF, OECD, EC, ECB, Fed, DBB and BOFIT databases.

II.4 Inflation forecast and change from the previous forecast

Except for the CF outlook for the USA and the IMF outlook for China, which were left at the previous level, the new outlooks (CF, EC, Fed and IMF) expect inflation to be higher in 2012 than previously estimated. The biggest changes were recorded for the IMF outlook for Germany and the EC outlook for the USA (upward revisions of 0.6 pp) and the IMF outlook for the USA (upward revision of 0.9 pp). The May OECD outlook is 0.7–0.8 pp higher for the euro area and Germany and 0.1–0.5 pp lower for the USA and China.



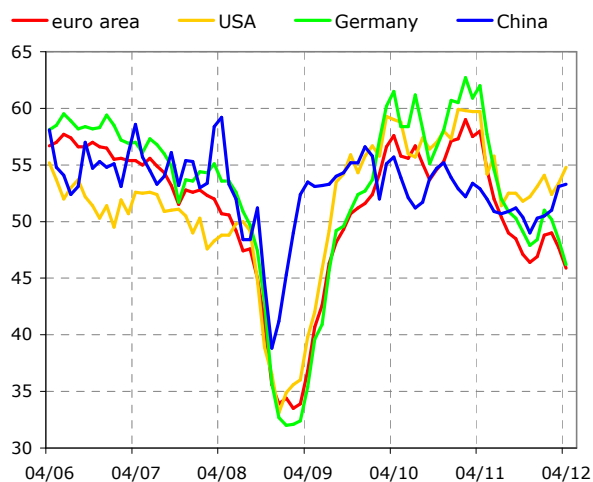
Note: Horizontal axis of left-hand (right-hand) chart shows latest (previous) forecast data in format "Source, month/year of forecast publication". HIST: historical value. ECB and Fed: midpoint of range.

[Cut-off date for data: 22 May 2012]

Source: CNB calculation using Eurostat, CF, IMF, OECD, EC, ECB, Fed, DBB and BOFIT databases.

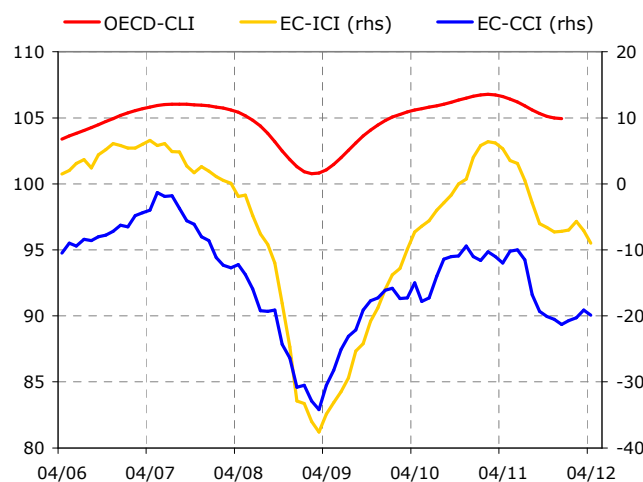
The economic outlook polarised further in 2012 Q2 and Q3 according to the May leading indicators, improving for the USA and China and weakening for the euro area and Germany. The PMI (Purchasing Managers' Index) in industry rose further above the 50% level in the USA and China and continued falling below this level in the euro area and Germany. Other leading indicators confirmed the above tendencies: besides the PMI, the Composite Leading Indicator and the University of Michigan Consumer Sentiment Index went up in the USA. In the euro area the Industrial Confidence Indicator and the Consumer Confidence Indicator worsened further. The consumer confidence indicators also deteriorated in Germany. The Ifo Business Climate Index was flat.

PMI IN MANUFACTURING



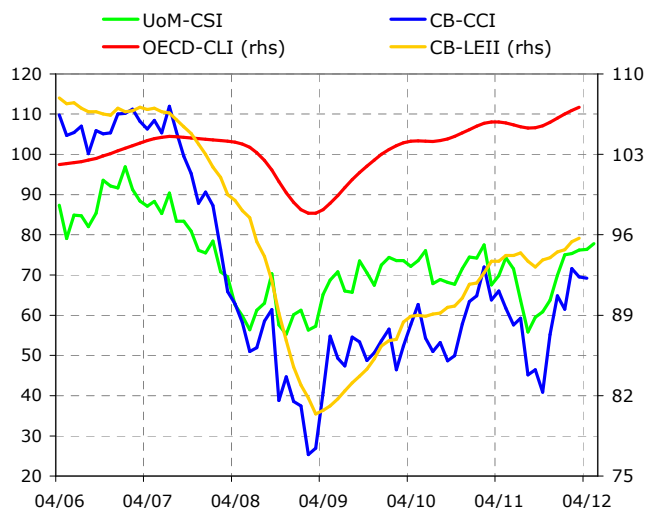
	EA	US	DE	CN
2/12	49.0	52.4	50.2	51.0
3/12	47.7	53.4	48.4	53.1
4/12	45.9	54.8	46.2	53.3

EURO AREA



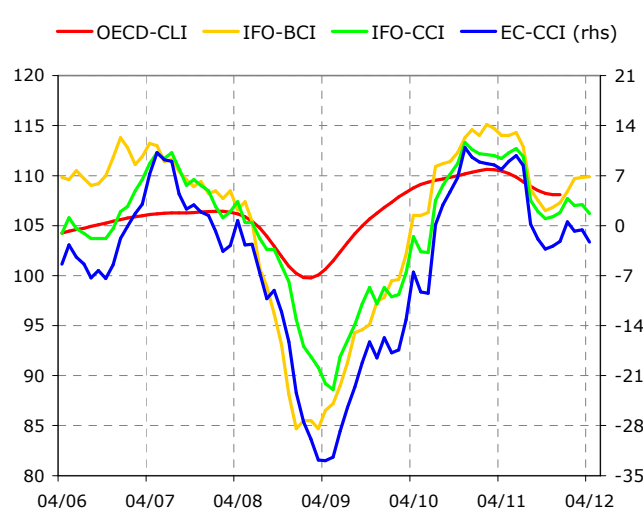
	OECD-CLI	EC-ICI	EC-CCI
2/12	105.0	-5.7	-20.3
3/12	104.0	-7.1	-19.1
4/12	103.0	-9.0	-19.9

USA



	OECD-CLI	CB-LEII	UoM-CSI	CB-CCI
2/12	106.8	95.4	75.3	71.6
3/12	107.1	95.7	76.2	69.5
4/12	107.1	95.7	76.4	69.2

GERMANY



	OECD-CLI	IFO-BCI	IFO-CCI	EC-CCI
2/12	105.0	109.7	107.0	-0.8
3/12	104.0	109.8	107.1	-0.6
4/12	103.0	109.9	106.2	-2.3

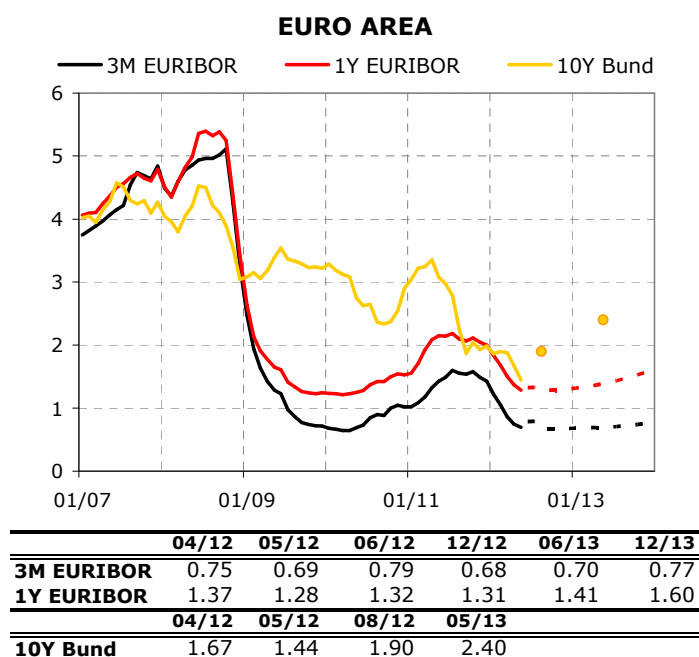
Note: OECD-CLI stands for OECD Composite Leading Indicator, EC-ICI (right-hand scale) for European Commission Industrial Confidence Indicator, EC-CCI (right-hand scale) for EC Consumer Confidence Indicator, CB-LEII for Conference Board Leading Economic Indicator, CB-CCI for CB Consumer Confidence Index, UoM-CSI for University of Michigan Consumer Sentiment Index, IFO-BCI for Institute for Economic Research – Business Climate Index, and IFO-CCI for IFO Consumer Confidence Index. [Cut-off date for data: 17 May 2012]

Source: CNB calculation using OECD, EC, IFO and UoM databases.

IV.1 Outlook for short-term and long-term interest rates: Euro area

As in the previous four months, unsecured 3M and 1Y EURIBOR rates continued to fall in May. In mid-May, the 3M rate declined below 0.68%. The current forecast based on implied rates shifted downwards compared to the previous month, particularly in the outlook up to the end of 2012. A more marked rise in 1Y rates is expected in 2012 H2. At its May meeting, the ECB again kept rates unchanged, as it expects price stability and low economic activity. The risks are on the downside and uncertainty is high. The decline in risk premia slowed significantly for both maturities.

The average German 10Y government bond yield fell further in April and May, reaching a new historical low in mid-May (1.37%). This was due chiefly to rising risk aversion related to the political situation in Greece and the banking sector problems in Spain. The new CF forecast also shifted downwards, mainly at the shorter horizon.



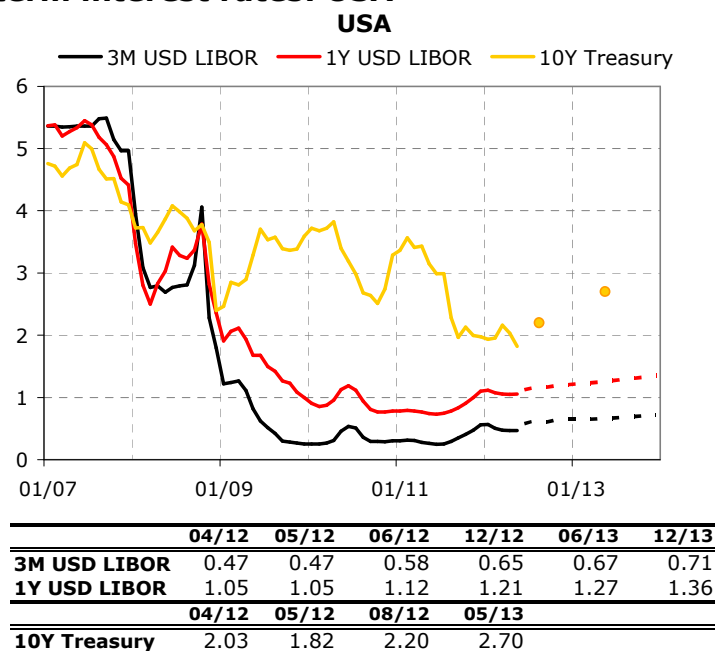
Note: Forecast for EURIBOR rates is based on implied rates from interbank market yield curve (FRA rates are used from 4M to 15M and adjusted IRS rates for longer horizons). Forecast for German government bond yield (10Y Bund) is taken from CF. Dashed lines and points represent outlook. [Cut-off date for data: 17 May 2012]

Sources: Thomson Reuters (Datastream), Bloomberg, CNB calculations.

IV.2 Outlook for short-term and long-term interest rates: USA

As in previous months, both 3M and 1Y USD LIBOR rates were flat. The implied future 1Y LIBOR rate path also remained slightly rising, with the longer end of the curve for 1Y rates having recorded a more marked upward movement. By the end of 2013, 3M rates are expected to increase by only 0.2 pp and 1Y rates by 0.3 pp.

Risk aversion related to the situation in Spain and Greece also affected US bond rates. The US 10Y government bond yield decreased to 1.85% owing to the uncertainty in the first half of May. The new CF forecast also shifted downwards compared to the previous month.

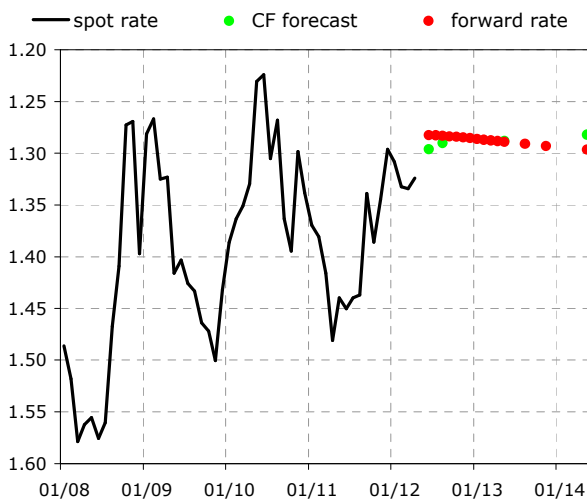


Note: Implied LIBOR rates are derived from London interbank market yield curve. Forecast for 10Y Treasury yield is taken from CF. Dashed lines and points represent outlook. [Cut-off date for data: 17 May 2012]

Sources: Thomson Reuters, Bloomberg, CNB calculations.

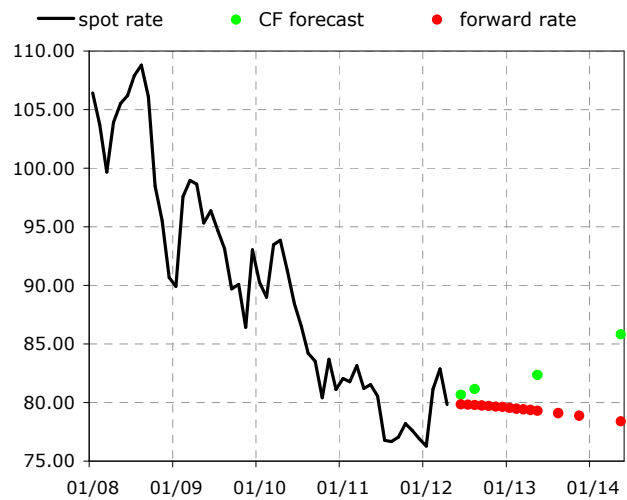
The political and economic situation in the euro area fostered a rise in risk aversion and appreciation of the dollar against the euro in early May. Spain's rating downgrade and the rescue plan for one of the biggest Spanish banks were accompanied by information on political instability in Greece, where attempts to form a new government failed. In addition, economic developments on the EU periphery were far worse than expected. The exchange rate of the dollar against the euro consequently appreciated to USD 1.26 in May 2012. The outlook remained unchanged owing to the high uncertainty. The May CF forecast expects the exchange rate to be stable at around USD 1.29 to the euro at the two-year horizon. As in the case of the dollar, there was growing interest in the Swiss franc and the Japanese yen. The franc is still close to the ceiling set by the Swiss central bank, which repeated its interest in maintaining the ceiling. The outlook for the pound shifted upwards slightly, although it is still expected to be stable against the dollar.

US\$ per Euro



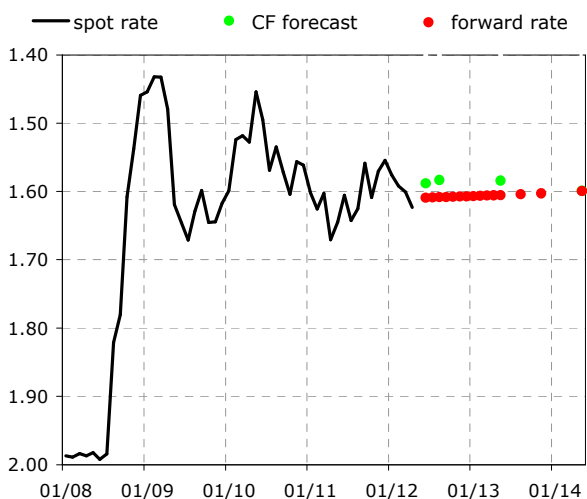
	14/5/12	06/12	08/12	05/13	05/14
spot rate	1.282				
CF forecast		1.296	1.290	1.288	1.282
forward rate		1.282	1.283	1.289	1.296

Yen per US\$



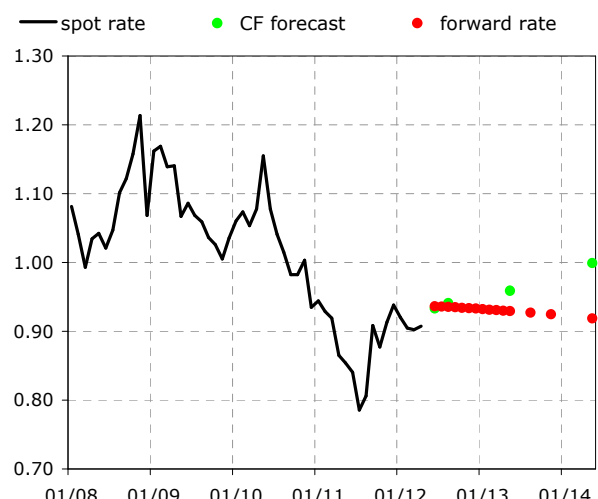
	14/5/12	06/12	08/12	05/13	05/14
spot rate	79.85				
CF forecast		80.66	81.16	82.35	85.82
forward rate		79.83	79.78	79.29	78.38

US\$ per UK£



	14/5/12	06/12	08/12	05/13	05/14
spot rate	1.609				
CF forecast		1.588	1.583	1.584	1.599
forward rate		1.609	1.608	1.605	1.599

Swfr per US\$



	14/5/12	06/12	08/12	05/13	05/14
spot rate	0.937				
CF forecast		0.933	0.941	0.959	0.999
forward rate		0.936	0.935	0.929	0.919

Note: Increase in currency pair represents appreciation of US dollar; data as of the last day of the month. Forward rate does not represent outlook; it is based on covered interest parity, i.e. currency of country with higher interest rate is depreciating. Forward rate represents current (as of cut-off date) possibilities for securing future exchange rate. [Cut-off date for data: 17 May 2012]

Source: CNB calculation using Bloomberg and Consensus Forecasts databases.

VI.1 Oil and natural gas

The price of Brent crude oil started to fall in early April and was only just above USD 118 a barrel in the second half of the month. Early May saw a sizeable price decline (of USD 6.5 a barrel) following ECB comments about an ever more uncertain outlook for the European economy and unfavourable data from the Chinese economy. The price then continued to fall at a more modest pace in reaction to worse-than-expected data from Europe and the USA. The price was also pushed down by the appreciating dollar as the euro reacted negatively to the worsening political situation in Greece, and also by the fact that hedge funds significantly reduced their long futures positions across commodities. Another sharp fall in the price of Brent crude oil occurred on 18 May in reaction to the downgrading of the ratings of 16 Spanish banks by Moody's. The Brent crude price fell below USD 107 a barrel. The fall in the WTI price was less dramatic, as in the next few days oil should start flowing to the Gulf Coast through the reversed Seaway pipeline. The difference between Brent and WTI prices thus fell below USD 15 a barrel.

VI.2 Other commodities

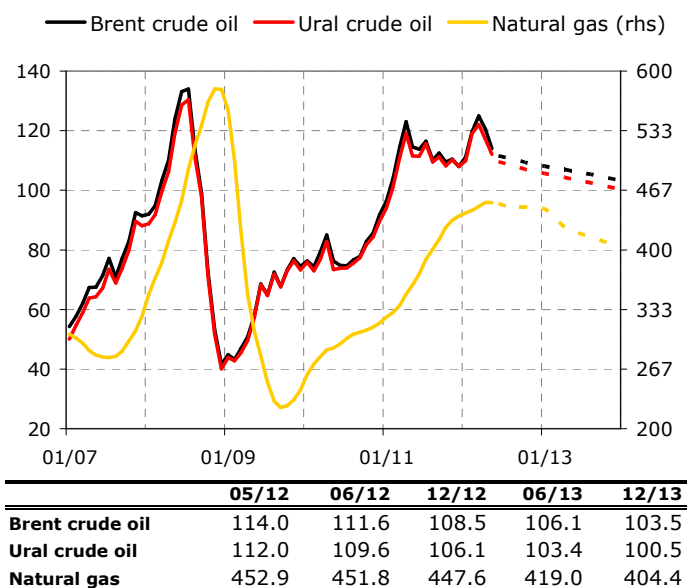
Prices of non-energy industrial commodities declined last month and prices of food commodities also started to fall again. The outlook for both sub-indices shifted downwards as well.

In the food category, the index is expected to continue falling for most of this year, mainly because of a decline in soy and maize prices related to oil price developments. By contrast, wheat and rice prices are expected to rise. A marked decline in prices of sugar, and also a drop in prices of cotton and rubber, are worth mentioning. The price of pork fell and a slight price decrease was also recorded for beef, for which, however, the forecast remains rising.

The outlook for most industrial metals expects prices to stay at the present level. Only for aluminium is it rising as usual, and for copper it is falling slightly.

The price of steel declined only slowly and the iron ore price returned to a higher level after a decline. By contrast, the price of coal recorded a further relatively strong decrease, although its outlook remains rising as usual.

OUTLOOK FOR PRICES OF OIL AND NATURAL GAS

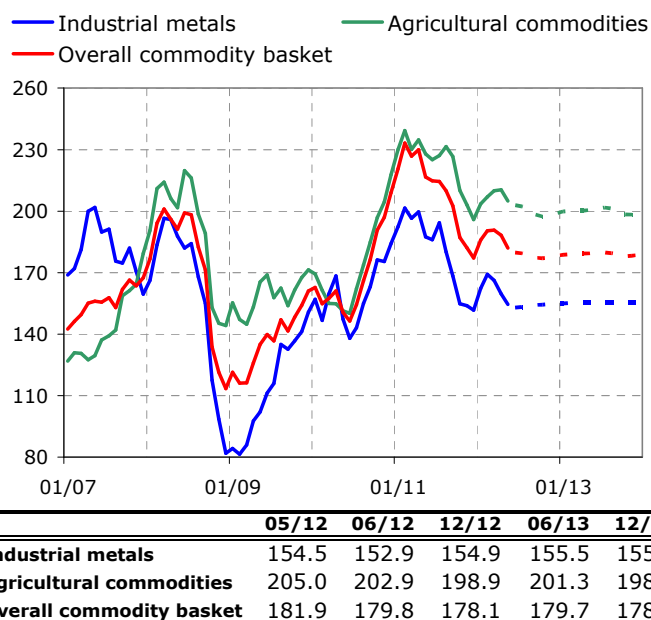


Note: Brent oil price in USD/barrel (ICE quotation). Price of Russian natural gas at German border in USD/1,000 cubic m (IMF database). Future oil prices are derived from oil prices. Dashed line represents outlook.

[Cut-off date for data: 14 May 2012]

Source: Bloomberg, IMF, CNB calculations.

OUTLOOK FOR OTHER COMMODITY PRICES



Note: Chart shows price indices, year 2005 = 100. Dashed line represents outlook based on futures.

[Cut-off date for data: 14 May 2012]

Source: Bloomberg, outlooks based on futures.

AN OVERVIEW OF THE WORLD'S MOST FREQUENTLY USED COMMODITY INDICES¹

There are currently many commodity indices (and sub-indices), differing in the number and structure of the commodities they are composed of, their calculation method and their primary purpose. In this text, we will provide a general introduction to commodity indices and discuss the most frequently used ones in more detail. To conclude, we will briefly mention the indices calculated at the Czech National Bank.

1 A general introduction to commodity indices

Commodity indices² can be divided by purpose into price indices (economic indicators) and investor return indices. In both categories, indices may differ in terms of composition, the weights of the components included and the method of determining the price (usually a combination of these factors). Weights are the main source of differences. They can be selected on the basis of either global factors (broader specification) or country or sector-specific factors (narrower specification).

Price indices should serve primarily as economic indicators. Each commodity, therefore, should have a weight corresponding to its current value flow (production, consumption, processing, trade) through the economy. The more commodities such an index contains, the better it reflects the aggregate commodity market. It is possible to deduce from such indices what impact commodity price developments will have on the real economy (e.g. inflation or economic growth). Where illiquid items are included, however, the overall index may be partially distorted, as in such cases it may be difficult to correctly determine the actual market price. The prices of the commodities monitored are mostly based on spot prices or derived from market prices of futures that are closest to maturity (and whose prices are closest to the spot price). Alternatively, long-term contract prices can be included (this is more common for indices published by public institutions such as the IMF and the Reserve Bank of Australia). However, long-term contract prices reflect market prices with a lag, and this, in turn, affects the relevant indices. Price indices do not include the costs of rolling futures contracts or the costs associated with storing physical commodities, and are therefore not investible.³

If commodity indices are to serve as investment return indices, it is important that the weights of the individual commodities correspond to the amounts of capital invested in them.⁴ As commodity investments can take various forms (the purchase and holding of a physical commodity, a long futures position on an organised market, a forward contract on an OTC market, an option, a swap, a long-term fixed-price contract), it is difficult to measure the capital invested in a commodity from production through to consumption. It is therefore assumed that the net long position of the economy for the commodity is roughly proportional to the quantity produced (change in inventories is ignored). Weights derived from the amount of production are therefore also important from the investment perspective. In addition, however, the liquidity of the asset concerned is also important for investment indices (as in the case of shares, for example). Therefore, the weights may also reflect the futures trading volumes. In some

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² Everything which is stated in the text for global indices usually also applies to their sub-indices, i.e. to branch, sector or other indices.

³ An investible index means that investors or management companies can purchase either the index directly or individual contracts so that the evolution of, and return on, their portfolio copies the evolution of the index.

⁴ On stock markets, for example, the individual shares in an index can be weighted by their market capitalisation. However, this is not possible for commodities.

cases, however, the liquidity requirement may be in conflict with the diversification requirement (the largest possible number of representative commodities). Investment return indices therefore typically contain fewer commodities than price indices.

Financial investments in commodities are usually made via futures markets,⁵ so the prices of commodities included in investment indices are derived solely from futures to make the resulting indices "investible". Investing through futures markets entails no storage costs and minimal financing costs. Unlike on the equity and bond markets, however, the investor does not want to, and usually cannot, hold the contract to maturity. Contract rollover is therefore necessary, meaning that the investor must close the position, i.e. sell the contract nearing expiration, and possibly open another position by buying a contract with a later delivery date, so that he never becomes obliged to take delivery of the physical commodity. These more or less forced sales and repurchases involve additional investment risks. An investible index must therefore also take into account the return (or loss) on futures rollover. The roll return depends on the current market situation. In the case of contango,⁶ the return is negative. Some indices and investment strategies therefore prefer investments at the longer end of the futures curve, which is usually flatter and less volatile, or actively select the section of the curve where the roll return is highest. Strategies that systematically attach a lower weight to commodities in contango, for example, are also used.

Investing in futures is not capital-intensive and the investor usually has to pay only a margin to cover trading costs and potential losses. However, the margin can be in the form of risk-free bonds and the investor can thus also make "collateral yield", which usually equals the yield on US Treasury bills.

Individual clearly defined investment return indices are mostly published in three possible forms. In simple price form (a spot index corresponding to the above-mentioned price indices), the index only reflects movements in the prices of the relevant commodities and measures the investor's return solely on the basis of the prices of the commodities and related futures.

An excess return index takes into account changes in prices of futures and additionally the costs/gains of rolling them. The return on holding and rolling a futures contract is theoretically equal to that of holding the physical commodity including storage costs (but excluding the cost of carry). If collateral yield is added, we obtain the total return index⁷ (see Figure 1).

The futures rollover technique is another source of differences between individual indices. The largest volumes are traded in contracts with the shortest delivery, which are therefore the most liquid. For this reason, investible indices prefer to use these contracts for rollover. The rising volumes of investment in commodities as an alternative asset (due partly to expected growth in commodity prices and expected higher returns compared to shares, and partly to portfolio diversification) also mean large and

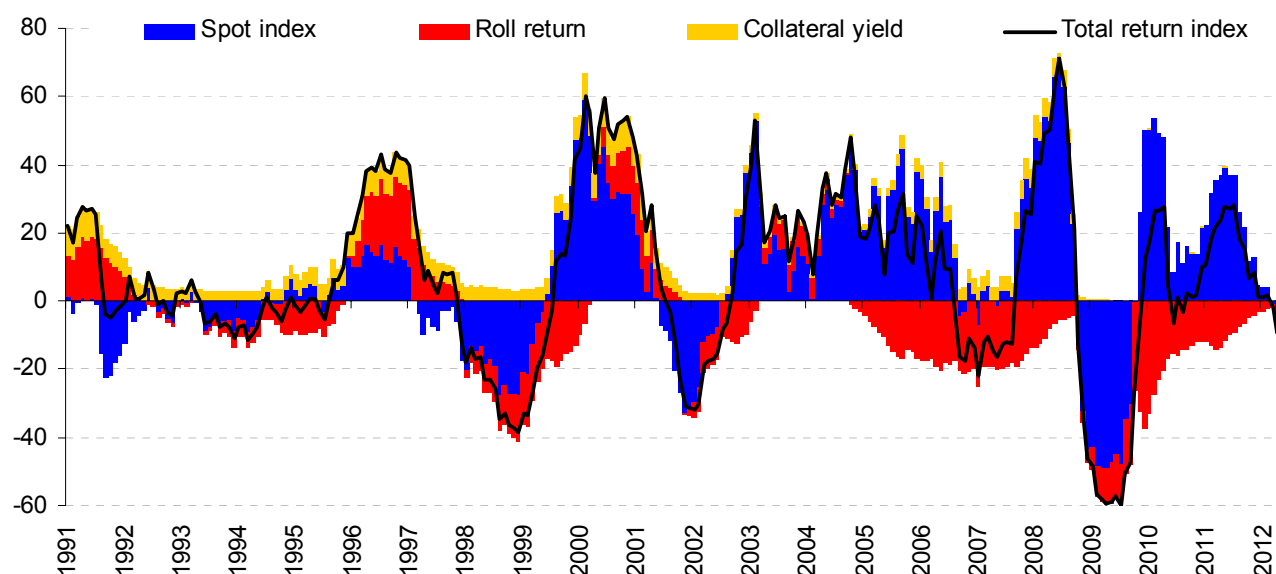
⁵ The return on investment in commodity futures is correlated with the return on investment in the purchase and holding of the physical commodity, but it is not the same. The price of a futures contract should include the cost of storage and the cost of carry so that there is no significant opportunity for risk-free arbitrage on the market. Therefore, the price should change depending on maturity, and a situation where longer contracts are priced higher should be normal. However, the opposite situation arises in some cases, with shorter contracts having higher prices than longer ones. This is explained by the "convenience yield" – the premium a buyer is willing to pay for physical ownership of the commodity. In any event, the futures price and the spot price converge as maturity approaches.

⁶ Contango is a situation on the market where the spot price (or, in the case of futures, the price closest to expiration) is the lowest and rises with increasing time to expiration (at least for a time). The opposite case, where the spot price is the highest and decreases as the time to expiration increases, is called "backwardation".

⁷ Commodity investment also has the advantage of portfolio diversification, but its return is difficult to quantify.

increasing rollover amounts. Rollover trades are therefore usually distributed over a longer time period (typically several days before the contract matures).

Figure 1: Decomposition of total return index (S&P GSCI – in % year on year)



Source: Thomson Reuters Datastream, author's calculations

2 Commodity price indices (non-investible)

Price indices are used mainly as economic indicators, either at the global level or at the level of continents or individual countries. Their sub-indices track individual sectors or branches of the economy in more detail.

- **IMF All Primary Commodity Index** (IMF APCI)

The APCI weights are derived from world trade values and are updated every five years. Currently they are for 2002–2004, with a 2005 average = 100 base. Commodities having a trade value of 3% or more of total world commodities trade are represented. Prices of long-term contracts (e.g. the Ural gas price at the German border) are also included. The APCI may be updated retroactively. It is based on nominal non-seasonally adjusted USD prices (mostly weekly and monthly averages) which are representative of the global market and are taken from the largest exporter. The similar commodity index of the World Bank differs in that it puts more emphasis on developing countries and excludes developed economies from the trade value calculation.

See <http://www.imf.org/external/np/res/commod/comp.pdf> for the composition.

- **The Economist Commodity-Price Index** (ECI)

The ECI is regarded as the world's oldest regularly published commodity index (first published in 1864, with figures stretching back to 1845). It is updated every week and the current base is 2005 = 100. The current weights are derived from the dollar value of commodity imports into the EU in 2004–2006. The ECI is made up of 25 commodities and excludes oil and precious metals. Foods currently account for 51% and industrials for 49% of the index.

See <http://media.economist.com/media/pdf/Weights2005.pdf> for the composition.

- **CRB BLS Spot Index** (CRB BLS SI)

In January 1934 the US Bureau of Labor Statistics (BLS) began the computation of a daily commodity price index containing sensitive basic commodities⁸ (28 commodities with August 1939 as base). It was first published in January 1940. In 1952 the Bureau switched to a new Daily Index of Spot Market Prices (which, however, was not a continuation of the old one). The new index consisted of 22 commodities and its base and weighting scheme have changed from time to time since then. In May 1981 the Commodity Research Bureau (CRB) began calculating the index on a daily basis. Where spot prices are not available, asked or bid prices are used (i.e. not transaction prices). The index now contains 23 commodities and is calculated with a 1967 = 100 base. The basic breakdown of the overall index is similar to that of the ECI, i.e. industrials (59.1%) and foodstuffs (40.9%). However, the detailed breakdown differs significantly. The index is calculated as an unweighted geometric mean, as this suppresses the effect of extreme price movements.

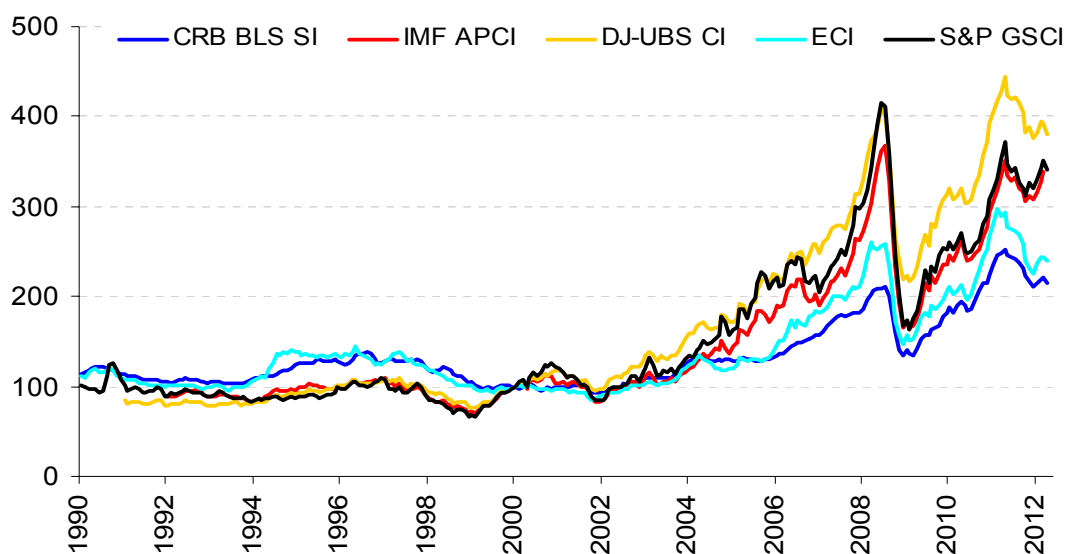
See http://www.crbtrader.com/crbindex/spot_current.asp for the composition.

- **Reserve Bank of Australia Index of Commodity Prices** (RBA ICP)

The ICP is a measure of the prices received by Australian commodity exporters, and its weighting scheme reflects this. It is a weighted arithmetic average (Laspeyres index). The base-period weights are updated periodically to reflect changes in export volumes. The commodities included are also periodically reviewed according to their importance, and the index is back-cast to reflect the new structure. The current base is 2008/09. The index contains 20 key commodities currently accounting for around 85% of Australia's primary commodity export earnings. It is published every month. Some prices are estimated at the time of publication and the index is revised subsequently.

See <http://www.rba.gov.au/publications/bulletin/2009/oct/2.html> for the composition.

Figure 2: Comparison of some price indices (January 2000 = 100)



Source: Thomson Reuters Datastream, Bloomberg, The Economist

⁸ "Sensitive" commodities are raw materials or products close to the initial production stage which are freely traded in large quantities daily and whose markets are presumed to be among the first to react to changes in economic conditions or expectations. As such, they serve as early indicators of changes in business activity.

3 Investment return indices (investible indices)

Investible indices have emerged mostly since the 1990s. Owing to gradual qualitative changes (especially as regards investment return), they are sometimes classed into different generations (see, for example, Brooks and Langerup, 2011, or Dunsby and Nelson, 2010).

First-generation indices – passive, classic

These indices are designed to represent the most widespread (in terms of production or liquidity) commodities in the most liquid part of the futures curve. As a result, they only roll futures that are close to maturity. Investments replicating these indices must therefore be rolled frequently, which increases trading costs. Another disadvantage of investing at the front end of the futures curve is that rolling is most loss-making during contango (which is usually steepest at the front end of the futures curve). First-generation indices are thus among the indices with the lowest investment returns.⁹

- **Thomson Reuters/Jefferies CRB Index** (TR/J CRB)

The CRB Index was constructed at the Commodity Research Bureau in 1957 and comprised 28 commodities. It is periodically updated to serve as a benchmark for the performance of a diverse basket of commodities as an asset class. Since its most recent (tenth) revision in 2005 (when it was also given its current name), it has been composed of 19 commodities sorted into four groups: energy (39%), agriculture (41%), precious metals (7%) and base/industrial metals (13%). Only the nearest futures contracts are currently rolled (a window of 6–12 months was averaged in the past). A four-day period at the start of each contract month is used for the roll. In the latest revision the averaging technique was changed from geometric to arithmetic. The weights are rebalanced monthly so that each commodity maintains a fixed weight even if relative prices change (the aim is to reduce the volatility of the index and improve absolute returns, since the rebalancing process increases the number of contracts whose prices are trending lower and decreases the number of those trending higher). It is available as excess return (ER) or total return (TR).

See http://thomsonreuters.com/content/financial/pdf/i_and_a/indices/trj_crb.pdf for the composition.

- **Standard & Poor's Goldman Sachs Commodity Index** (S&P GSCI)

The GSCI has been published since 1991 (and is back-calculated to 1970; before 2007 it was called the Goldman Sachs Commodity Index). It currently contains 24 futures contracts, which are liquid and actively traded on futures markets. The weights are based on the dollar volume of world production (a five-year moving average). At the end of 2011, energy had the largest weight (70.5%), followed by grains (14.7%), precious metals (3.5%), industrial metals (6.6%) and livestock (4.7%). The weights and components are reviewed once a year and the changes can be significant at times. The price is calculated from the contract with the nearest delivery month. However, the price of the next contract is increasingly taken into account from the fifth to eighth day of the month (gradual roll), and from the ninth day onwards, the contract price with a delivery

⁹ It is said that the low return on first-generation indices is paradoxically the reason why investment fund portfolio managers choose them as benchmarks for assessing their own performance.

in the following contract month is considered. The resulting index is a weighted arithmetic average of the components. The large weight of energy makes it less attractive to investors looking to diversify among commodity markets. It is available as ER and TR and also as a simple price (spot) index.

- **Dow Jones – UBS Commodity Index** (DJ-UBSCI)

The DJ-UBSCI – originally the Dow Jones-AIG Commodity Index – was launched in 1998. It is a broadly diversified index composed of 20 futures contracts on physical commodities in five groups, traded on US exchanges (with the exception of aluminium, nickel and zinc, which trade on the London Metal Exchange, and Brent crude oil, which trades on ICE Europe). Two-thirds of the relative weights are derived from the trade liquidity of futures and one-third from the dollar value of world production, with some other restrictions for better diversification. For example, the weights of individual commodities must be in the range of 2–15% and no group may exceed 33%. The shares of the commodities and the weighting scheme are changed every January. Five-year moving averages are taken into account, so the changes are not so drastic. In the current index, energy accounts for 32.6%, grains for 30.4%, precious metals for 12.6%, industrial metals for 18.6% and livestock for 5.7%. Contracts are usually rolled after two months, evenly over the sixth to the tenth working day of the month preceding the expiration month. The index is calculated as the arithmetic average based on the excess return (taking into account only price movements of futures including roll costs) or the total return (taking into account also the return on the fully collateralised investment position, where US 3M Treasury bills are used as collateral). It also exists in the form of a spot index and in a version with variable (optimised) selection of futures along the futures curve (see the second-generation indices).

- **Rogers International Commodity Index** (RICI)

The RICI was designed in the late 1990s as an instrument for broadly diversified investment in commodities. The commodities (38) are selected on the basis of the liquidity of their futures contracts on world exchanges. The weights are based on worldwide consumption of commodities (in USD) in developed and developing economies. For the sake of consistency, changes are rare and generally occur only after significant shifts in the world economy or markets. Prices of the nearest contract are considered and the index rolls over three days, beginning on the last business day of the month preceding the delivery month. The resulting index is a weighted average of the components. The commodities are subdivided into three subgroups – energy, metals and agriculture.

See <http://www.rogersrawmaterials.com/weight.asp> for the composition.

Second-generation indices (curve management, forward commodity indices)

The second generation of commodity indices adds the option of investing along part of or the entire futures curve. The indices tend to use one of two methods. The first method is to construct an index in the same way as a classic first-generation index, but instead of rolling the nearest (and most liquid) contracts, the index uses contracts with a longer time to maturity (e.g. DJ-UBS CI3). The second method is to use a constant maturity strategy (e.g. UBS CMCI). Under this strategy, indices have constant weights across commodities but the position in a single commodity is spread along the futures curve into several contracts with various expirations. Since futures curves tend to be

flatter and less volatile at longer maturities, the effects of contango and backwardation tend to be smaller and the indices tend to be less volatile than the classic ones.

- **Dow Jones UBS Commodity F3 Index** (DJ-UBS CI3)

The DJ-UBS CI3 invests in more distant contracts (with maturities of 4–6 months) but sells them 3 months in advance. It takes advantage of the fact that futures curves tend to be flatter as tenor is extended and the effects of contango and backwardation are therefore reduced.

- **UBS Bloomberg Constant Maturity Commodity Index** (UBS CMCI)

The CMCI uses 3, 6, 12, 24 and 36 month contracts, which are regularly rolled to maintain an average maturity of approximately 7.7 months.

- **JP Morgan Commodity Curve Index** (JPM CCI)

Third-generation indices – enhanced commodity indices

Third-generation indices are similar to second-generation ones in that they spread contracts along the futures curve, but differ in that they try to continually change the maturities and weights of contracts according to their expected attractiveness. Optimum yield indices select contracts along the futures curve which maximise positive roll returns (or minimise negative roll returns) while maintaining a given expiration time range and commodity structure. Price momentum indices overweight commodities that are expected to have rising returns and underweight commodities that are expected to have falling returns. Hybrid indices combine two or more selection and rolling strategies.

- **Deutsche Bank Liquid Commodity Index – Optimum Yield** (DBLCI-OY)

This optimum yield index looks at liquid tradable futures contracts expiring in the next 1–13 months and selects those which either maximise the positive roll return when a futures curve is in backwardation or minimise the roll loss when a futures curve is in contango. This index overweights the energy sector.

- **SummerHaven Dynamic Commodity Index** (SDCI)

The strategy of this hybrid index is to select 14 equally weighted commodity futures contracts from a universe of 27 so that the first seven maximise the implied roll yield and the next seven should have the highest expected yield based on price momentum.

- **Auspice Broad Commodity Total Return Index** (ABCTRI)

The ABCTRI determines commodity purchases and sales on the basis of a price trend following strategy. The maturity of futures contracts is selected so as to maximise the roll return.

Fourth-generation indices – active commodities selection

These indices use considerable discretion rather than relying solely on a systematic or mechanistic approach to the selection of commodities and the maturity of futures contracts. One of the drawbacks is that they cannot be backfilled. Indices which aim to estimate future returns using models have also emerged recently. These models are

based, for example, on the observation that commodities with lower inventories offer higher returns (see Gordon, Hayashi and Rouwenhorst, 2008).

- **UBS Bloomberg Constant Maturity Commodity Index – Active Index** (UBS CMCI-AI)

Since August 2007, an active index variant has been published which follows the standard CMCI methodology, but adjusts weights discretionarily depending on UBS analysts' market analyses.

4 Commodity indices calculated at the CNB

Since commodity prices worldwide are an important fundamental affecting domestic inflation, great attention is paid to commodities at the CNB, too. Prices of oil (Brent crude), fuel prices on exchanges in North-West Europe and gas prices (Ural gas at the German border as published by the IMF) are monitored separately. In addition, commodity indices based on the structure and the weight scheme of The Economist commodity index, which seems to be the most relevant one for Europe, are regularly calculated at the CNB. To complement these commodity indices, an energy commodity index aggregating the Brent crude oil price (40%), the coal price (40%) and the gas price (20%) is also calculated.

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BOFIT	Bank of Finland Institute for Economies in Transition
BR	Brazil
BRIC	Brazil, Russia, India and China
CB-CCI	Conference Board Consumer Confidence Index
CB-LEII	Conference Board Leading Economic Indicator Index
CBOT	Chicago Board of Trade
CF	Consensus Forecasts
CN	China
CNB	Czech National Bank
DBB	Deutsche Bundesbank
DE	Germany
EA	euro area
EC	European Commission
ECB	European Central Bank
EC-CCI	European Commission Consumer Confidence Indicator
EC-ICI	European Commission Industrial Confidence Indicator
EIU	The Economist Intelligence Unit database
ES	Spain
EU	European Union
EUR	euro
EURIBOR	Euro Interbank Offered Rate
Fed	Federal Reserve System (the US central bank)
FRA	forward rate agreement
GBP	pound sterling
GDP	gross domestic product
GR	Greece
CHF	Swiss franc
ICE	Intercontinental Exchange
IE	Ireland
IFO	Institute for Economic Research
IFO-BCI	IFO – Business Climate Index
IFO-CCI	IFO – Consumer Confidence Index
IMF	International Monetary Fund
IN	India
IRS	Interest rate swap
IT	Italy
JP	Japan
JPY	Japanese yen
LIBOR	London Interbank Offered Rate
N/A	not available
OECD	Organisation for Economic Co-operation and Development
OECD-CLI	OECD Composite Leading Indicator
PT	Portugal
RU	Russia
UoM	University of Michigan
UoM-CSI	University of Michigan Consumer Sentiment Index
US	United States
USD	US dollar

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